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Toward Profiling Physicians for Inpatient Services: Florida

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EXECUTIVE SUMMARY

Profiling is a tool for analyzing physician practice patterns. This paper, which profiles Florida physicians for their inpatient services, is intended as a prototype in order to stimulate discussion.

Starting with all the Medicare claims in the second half of 1991 for beneficiaries residing in Florida, we linked physician services to hospital admissions. For each hospital, the Relative Value Units (RVUs) of the physician services were summed and casemix-adjusted using national weights. This created a measure of physician service volume--casemix-adjusted RVUs per admission--which we use to profile. Whereas mean volume nationwide was 39.3 RVUs per admission, in Florida it was 45.8 RVUs per admission--17 percent above the national mean.

The paper's most important contribution is to report RVUs per admission for each Florida hospital. We also analyze physician services by metropolitan area, hospital type (e.g., urban-rural location), and type-of-service category (e.g., hospital visit versus imaging services). Although Florida as a whole is well above the U.S. mean, there is considerable variation among hospitals--many are significantly above the state mean and others are significantly below the state mean.

For many type-of-service categories, Florida hospitals are again consistently above the U.S. mean. For instance, Florida hospitals had 16 percent more hospital visit RVUs per admission than hospitals nationally, and 41 percent more standard imaging RVUs. We find that hospitals that are high overall tend to be high in most type-of-service category. That is, service volume by type-of-service category tend to move in parallel. Finally, the paper provides an example of physician-level profiling within a hospital.

Profiling medical staffs by type of service and by physician could be used by medical staffs to understand the sources of costs and to control costs.

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INTRODUCTION

Physician profiling analyzes individual physicians or groups of physicians to identify a pattern of practice, which is then compared to the patterns of other physicians or to an accepted standard of care (Lasker, Shapiro. and Tucker, 1992). Profiling can pertain to either the numbers of services, costs, or outcomes for the purposes of examining costs and improving quality of care. Profiling requires large-scale databases and population-based rates to discern and compare patterns of care. By way of contrast, Medicare's Peer Review Organizations (PROs) often select small samples of admissions and assess their necessity through chart review.

The profiling of Medicare physician practices received attention with the passage of Omnibus Budget Reconciliation Act of 1989 (OBRA 89). OBRA 89 reformed Medicare physician payment by replacing the usual and customary payment methodology with a resource-based fee schedule and by making all physician services subject to volume performance standards. Profiling can help physicians better understand variations in their practices when making decisions on containing volume growth while maintaining quality of care. To that end, Section 6102(c) of OBRA 89 requires all Medicare carriers to have the capability to profile physician services.

This paper, although limited to Florida physicians, is intended to stand as a prototype for profiling inpatient physician services. Although a majority of Medicare physician expenditures are for outpatient services (including those in hospital outpatient departments), there are several reasons for initiating profiling efforts with inpatient services: i) One can clearly define an episode of care as the hospital stay. ii) Using diagnosis related groups (DRGs), one can plausibly adjust services per episode for casemix. iii) The medical staff of a hospital (i.e., all the physicians

practicing in a hospital) is an organizational structure that could use profiling to encourage physicians to modify their practice of medicine.[1] iv) A majority of Medicare expenditures (Parts A and B) are associated with hospitalization. Assuming that inpatient physician services and facility services are complementary, by profiling physician services, one is implicitly profiling facility services. Although each of these advantages has its limitations, inpatient physician services is a useful focus for early profiling efforts.

In profiling inpatient practice patterns, we measure the volume and intensity of physician services delivered during a hospital stay. Physician services are measured in terms of relative value units (RVUs), which are the basis of the Medicare fee schedule. Being free of geographic variations due to practice costs or historical charges, RVUs are a direct measure of volume (the number of services) and intensity (the complexity of services). To control for differences in the mix of patients, RVUs per admission are casemix-adjusted using DRGs. As a shorthand, this will be referred to as "service volume," "volume per admission," or "volume."[2]

There is substantial literature demonstrating wide variations in physician practice patterns (Wennberg, 1984; Welch, et al., 1993). These variations suggest that the medical profession lacks a consensus regarding what constitutes appropriate care for many medical and surgical cases. Not surprisingly, this paper identifies certain hospitals as having extremely high or low physician services per admission. These data in and of themselves should not be taken as indicating excessive resource consumption or inadequate care. There may be legitimate

[1]Generally, the terms "hospital" and "medical staff" can be used interchangeably, because a hospital cannot function without a medical staff (i.e., its physicians) and a medical staff cannot function without a hospital. It is only when a hospital's physicians act corporately (e.g., review practice patterns) that we use the term "medical staff."

[2]In earlier work, we used the term "intensity."

conditions for finding a hospital far from the norm even after casemix adjustment. Nonetheless, the data do raise questions regarding the appropriate amount of resources being consumed in certain hospitals. We believe that routinely providing profiling data such as those presented below to medical staffs could begin to correct some of the excesses and deficiencies. Furthermore, using profiling with other types of analyses (e.g., PROs, practice guidelines) could bring the medical profession closer to defining appropriate care.[3]

DATA AND METHODS

The source of our data is the National Claims History File (NCHF), which is the Health Care Financing Administration's new data system. The NCHF is derived from the Common Working File, which is used for the timely payment of bills. From these data, HCFA's Bureau of Data Management and Strategy (BDMS) created a file composed of claims for Medicare beneficiaries whose residence was in Florida. This file had all the claims for hospital and physician services delivered in the second half of 1991. This is the first time period in which NCHF had high-quality data on Unique Physician Identification Numbers (UPINs), which are necessary to profile the practice patterns of individual physicians. We excluded beneficiaries without Part B and beneficiaries enrolled in HMOs (including Health Care Prepaid Plans),

[3]An additional reason for focusing on the inpatient services is that it provides a useful compliment to the small area variations literature (Wennberg, 1984). That literature has found substantial variations in utilization rates that are not adequately explained by differences in socio-economic characteristics, levels of insurance, and disease burden. Differences in practice style resulting from physicians' lack of consensus on what constitutes appropriate care is thought to account for some of these differences. This small-area research, however, has focused on admission rates (e.g., hysterectomies per 1000), ignoring variations in practice when the admission occurs. Welch, et al. (1993) is a counterexample.

because HCFA lacks detailed physician service claims for these beneficiaries.[4] The resulting file has almost a quarter of a million admissions.

This file had two types of records: admissions and physician services. The admission record had the beneficiary identification, hospital identification, the dates of admission and discharge, DRG code, and the beneficiary's age and sex. The physician record had the beneficiary identification, the physician identification (UPIN), the date (or dates) service, the code for physician service, and the quantity of that service. Physician claims were linked to an hospital admission claim based on the beneficiary identification number and dates of service.

Figure 1 illustrates our data and several aspects of our methodology. To maintain confidentiality for this actual admission, we changed the beneficiary name, hospital name, and physician IDs. In Figure 1, Mr. Smith was admitted, say, on January 1. On the day of admission he was given two X-ray procedures and received a hospital visit from his physician. The same physician saw him the following day and four more times by January 7. After receiving two more X-ray procedures and four more visits, he was discharged on January 19.

Although the 1991 NCHF reports the charge for each physician bill, charges are a poor measure of physician services because they vary geographically and are widely believed to overvalue procedures (e.g., surgery) and undervalue evaluation and management services (e.g., hospital visits). Because our data pertain to services delivered in 1991, which is prior to the implementation of the Medicare fee schedule, RVUs were not used for payment. However, as

[4]The small percentage of beneficiaries who lack Part B coverage are ineligible for physician service benefits. Since HMOs are paid a capitation rate, HCFA does not receive detailed claims for their physician services.

Also note that admissions involving border-crossing were excluded. The NCHF organizes its claims by the residency of the beneficiary. Given this and the size of the NCHF, it is more efficient to select beneficiaries based on their state of residency than by the state (or states) in which they were admitted to a hospital. Hence, beneficiaries whose residence was in New York but who were admitted to a Florida hospital were excluded from our file. Similarly, Florida beneficiaries admitted to non-Florida hospitals were excluded because of our focus on Florida hospitals.

mentioned, RVUs are a direct measure of physician service volume and intensity and will continue to be used by Medicare to pay physicians. Hence, we assigned RVUs to each physician bill and used RVUs as our measure of physician services. (Whether assigning RVUs to 1989 or 1991 claims, this paper used the same set of RVUs.)

To do so, RVUs were assigned to physician claims using the CPT-4 code and modifier.[5] For instance, physician A billed Medicare for CPT 71010--chest X-ray, single view--for the professional component only (see Figure 1). Under the Medicare fee schedule, his or her payment would reflect .28 RVUs. Our assignment of RVUs took into account a number of complexities, such as changes in evaluation and management codes and the separate fee schedule for anesthesiology services (see Miller and Welch [1992] for a complete discussion). Each admission's RVUs were summed, as shown in Figure 1. In summary, physician bills are linked to an admission, RVUs are assigned to each physician bill, and RVUs are summed for the admission. It is this measure, RVUs per admission, that is the basis of our profiling.

The next step is casemix adjustment. To develop a casemix index, we used a national 5-percent random sample of Medicare beneficiaries in 1989. We followed the same steps through summing RVUs for each of about 450,000 admissions. Mean RVUs per admission were calculated for each DRG.[6] As presented in Figure 2, Heart Failure and Shock, the most common medical DRG, had 21.51 RVUs per admission; whereas Major Bowel Procedure, one of the most common surgical DRGs, had 92.38 RVUs per admission. Overall, there were 37.68 RVUs per

[5]More technically, HCFA uses HCPCS (HCFA Common Procedure Coding System) codes, which combine CPT (Current Procedural Terminology) codes and a set of HCFA-created codes.

[6]We imputed average RVUs for DRGs with few Medicare admissions (e.g., neonates) and for DRGs with unusually high variances in volume per admission. Imputation involved PPS weights, and the affected DRGs represent, in total, only 10 percent of admissions.

admission in 1989. (Note that all other figures in this paper pertain to 1991.) Relative weights for the nation were created by dividing each DRG's mean RVUs by the overall mean RVUs (e.g., Heart Failure and Shock's 21.51 RVUs were divided by the overall mean of 37.68 to yield a relative weight of .57).

We next calculated casemix-adjusted RVUs per admission for a hospital. Each admission was assigned a (national) relative weight based on its DRG. We summed both the relative weights and the RVUs across a hospital's admissions. The ratio of RVUs to relative weights is casemix-adjusted RVUs per admission, which we term "volume per admission." (See Appendix A for a discussion of averaging admissions.)

Finally, we note several methodological issues pertaining to our casemix index. Our previous research indicates that the DRG-based weights for physician services are highly correlated with the DRG-based weights used by Medicare's Prospective Payment System (PPS) and that our index accurately measures variations in physician services at the hospital level (Miller and Welch, 1992). In fact, DRGs explain variation in inpatient physician services better than variations in inpatient facility costs (Mitchell, et al., 1984).

Nonetheless, there is an issue regarding patient severity (that is, within-DRG variation in patient need). Certain patients are more severely ill than other patients in the same DRG, and therefore require more resource-intensive physician services to treat. We adjust for casemix but not for severity. Although the literature presents a number of measures of severity, none of them seem adequate to our task. One problem is that most measures of severity suffer from circularity: how a patient is treated affects the measure of severity (Richards, et al., 1988). A second problem is that many measures of severity cannot readily be computed from information included on the claims in the HCFA data system (Iezzoni, Shwartz, and Restuccia, 1991).

As a part of this project, we investigated the possible impact of severity on profiling. Iezzoni et al. (1988) measured the ability of severity to explain the variation in hospital facility cost by DRG. They identified 17 DRGs for which severity had little impact on the percentage of explained variance and 11 DRGs for which severity had considerable impact. For each of about 900 physicians, we calculated the casemix-adjusted RVUs per admission for the severity-insensitive DRGs and separately for the severity-sensitive DRGs. At the physician level, the coefficient of variation for the two groups of DRGs was almost identical. That is, physicians' volume per admission has about the same variance for both severity-sensitive and -insensitive DRGs. These results suggest that the individual physician's practice style is important in explaining volume of services per admission. Nonetheless, severity, a long-standing issue for Medicare's PPS for hospitals, will still justifiably be an issue in interpreting our data.

RESULTS

Metropolitan Areas

Although volume per admission by hospital is of primary interest, it is useful to start by considering variations in volume per admission by metropolitan area. As Florida is a large state with more than 200 hospitals, metropolitan areas offer a useful overview. The Office of Management and Budget and the Census Bureau define 20 Metropolitan Statistical Areas (MSAs) in Florida. Nonmetropolitan areas are labeled "rural" by HCFA.

The mean volume nationwide was 39.3 casemix-adjusted RVUs per admission in 1991. Florida is 17 percent above the national mean, with a mean volume of 45.8 RVUs per admission.

Florida is one of the highest volume states.[7] Although our focus is on the volume of physician services per admission, it is useful to express volume in terms of dollars. Under its new fee schedule, Medicare paid about $31 per RVU in 1992. Multiplying $31 times the U.S. mean of 39.3 RVUs per admission yields $1218 per admission. In Florida the typical admission has $1420 of physician services associated with it. These figures can be thought of as physician expenditures adjusted for casemix and for variations in fees.

As shown in Table 1, there is considerable variation in casemix-adjusted volume per admission across Florida metropolitan areas. Volume ranges from about 20 percent below the state mean to 20 percent above that mean. In general, the MSAs with low volume are in the north, and those with high volume are in the south. For instance, of the five MSAs with the lowest volume (excluding rural areas), four are in the north--Daytona Beach, Fort Walton Beach, Pensacola, and Tallahassee. The four MSAs with the highest volume are all on the southeastern coast.

Hospital Medical Staffs

Table 2 ranks 207 Florida hospitals by casemix-adjusted volume per admission.[8] Our discussion focuses on six hospitals in Figure 3. For instance, Jackson Memorial Hospital in the Miami MSA had volume of 40.0 RVUs per admission, which is above the U.S. mean but only 87

[7]Although we have used national rates as our benchmark, other standards of comparisons are plausible. The volume for Medicare beneficiaries in Health Maintenance Organizations could serve as a benchmark. Alternatively, states such as Oregon have volume per admission well below the national mean. If patients are no sicker in Oregon than elsewhere and have outcomes as good as elsewhere, Oregon could be an appropriate benchmark. Using the Oregon benchmark would make volume in Florida hospitals appear higher.

[8]AHA (1991) lists 224 short-term community hospitals in Florida. Our data from HCFA distinguished 220 hospitals. Thirteen of these did not match to AHA or other HCFA datasets. Hence, our dataset has 207 hospitals.

percent of the state mean. Based on 1110 Medicare admissions, this mean is significantly lower from the state mean, with t-value of 4.21. (See Appendix A for a discussion of significance testing.) Taking another example, AMI Palm Beach Gardens Medical Center in the West Palm Beach MSA had a volume of 53.1 RVUs per admission, which is 116 percent of the state mean. This is significantly higher than the state mean, with a t-value of 7.06.

Some medical staffs may suggest that such results are somehow conceptually invalid. One such concern is that one hospital's patient mix may different from another's. Patient mix is usually thought of as having two components: casemix as measured using DRGs and severity of illness, which pertains to the relative severity of patients in the same DRG.

Given our adjustment, if a hospital's volume is high (or low), it cannot be attributed to its casemix. For instance, surgical DRGs such as major bowel procedures typically entail far more resource-intensive physician services than medical DRGs such as heart failure. A hospital with a high proportion of surgical DRGs is likely to have more resource-intensive physician services per admission than one with a high proportion of medical DRGs. However, such possibilities cannot explain the lower than average volume of Jackson Memorial Hospital or the higher than average volume of Palm Beach Gardens Medical Center, because our measure of volume is casemix-adjusted. As noted above, we do not adjust for severity (within DRGs) and this will be an important issue in any discussion of our results.

A second likely concern is that an estimate of the mean could be the result of random fluctuation at the admission level. That is, some admissions to a specific hospital entail higher (or lower) than average amounts of physician services. If a mean estimate reflects the experience of only a few admissions, the estimate of the mean in another year could be rather different. However, the usual t-test allows us to test whether the hospital's volume is significantly different

from the state-wide mean. For certain hospitals, we are able to reject the hypothesis that the hospital's high (or low) volume is due to random fluctuation at the admission level. Thus, our methodology enables us to handle concerns regarding casemix and sample size but not (within-DRG) severity of illness.

Hospital Medical Staffs by Hospital Type

In investigating why certain hospitals have high (or low) casemix-adjusted volume per admission, one can consider the characteristics of the hospitals as well as the characteristics of their patients. For instance, to what extent is the volume at Jackson Memorial Hospital due to it being a major teaching hospital? A teaching hospital might use more resource-intensive physician services either because of the resources needed to train new physicians or because of higher than average severity of illness. Table 3 presents the mean volume of Florida hospitals by four hospital types. (The means are unweighted by the number of admissions in a given hospital.)

Most of the patterns in Table 3 are consistent with prior research on hospital facility costs by hospital type. Generally speaking, volume increases with bed size; larger hospitals may have greater patient severity or have more high-technology equipment (e.g., MRI machines) that permits more complex care. Volume is higher in large urban areas than small ones, where it is higher than in rural areas. (Large urban areas pertain to MSAs with at least one million population, which in Florida means Miami, Fort Lauderdale, and Tampa-St. Petersburg MSAs.) Urban hospitals (which may often be large) may have more high-technology equipment than rural hospitals or more severely ill patients. Volume is higher in hospitals that serve a disproportionate

share of the poor, as defined for the purposes of Medicare payment to hospitals. However, such hospitals have only a slightly higher volume than other hospitals.

The one pattern that may surprise some is that patients in major teaching hospitals receive fewer physician services than in either minor teaching hospitals or nonteaching hospitals, although other research has shown that the facility costs (Medicare Part A) are much higher in teaching hospitals than other hospitals. The apparent volume of physician services is an artifact of the Medicare payment system: substantial physician services in teaching hospitals are delivered by interns and residents, whose costs are treated as hospital facility costs and thus are not included as a physician payment in the Medicare data system. The patterns for these four hospital types in Florida are consistent with analogous figures for the nation.

Table 3 also includes the average casemix (for physician services) for each hospital type. Casemix, which has already been used to adjust volume per admission, is defined as a hospital's expected RVUs per admission (given its DRGs) divided by the national average RVUs per admission. By construction, the casemix for U.S. hospitals in 1989 was 1.00. Certain hospital types, most notably teaching hospitals, have above-average casemix. Whereas casemix is close to 1.00 for most states in 1991, it is 1.11 for Florida. The reason for this is unclear: possibly there is more DRG upcoding in Florida hospitals. If so, casemix-adjusted volume per admission would be even higher in Florida than calculated here.

One final comment should be made. Inferences regarding which hospital types cause high or low volume should not be drawn from Table 3. For instance, if most large hospitals are in urban areas, it is unclear whether size or location is affecting volume. One must control for all relevant characteristics at once to determine which characteristics have an impact on volume. To

this end, elsewhere we have used multivariate regression analyses with a national dataset (see Miller and Welch, 1992) and hence do not pursue this line of inquiry here.

Hospital Medical Staffs by Type of Service

A medical staff with high (or low) casemix-adjusted volume per admission might ask itself at least two questions:

- Are we high (or low) on all physician services or only selected ones?
- Are all the physicians practicing in our hospital high (or low) utilizers or only some?

Hence, the next two sections disaggregates volume by type of service and by individual physician.

Berenson and Holahan (1992) have devised an extremely useful type-of-service (TOS) categorization scheme, which groups about 7,000 CPT-4 codes into clinically meaningful categories. The system divides physician services into six (major) categories and 23 subcategories. Evaluation and management (E & M) services is the first major category. Its subcategories are office visits, hospital visits, emergency room services, home and nursing home visits, consultations, and specialist evaluation and management services. The last subcategory in this group includes E & M services provided by ophthalmologists, psychiatrists, pathologists, and allergists.

Procedures, the second major category, includes major procedures (subdivided into cardiovascular, orthopedic, and other), ambulatory procedures (subdivided into eye and other), and other procedures (subdivided into endoscopy, oncology procedures, dialysis services, and minor). Imaging, the third major category, is divided into standard imaging (routine x-rays and nuclear medicine), advanced imaging (CT scans and magnetic resonance imaging), sonographic

imaging, and imaging procedures (largely cardiac catheterization). The remaining three categories are tests (subdivided into laboratory and other), anesthesiology, and other services.

In sum, these categories and subcategories are as follows:

Evaluation and management services
- Office visits *
- Hospital visits (13.00)
- Emergency department services *
- Nursing home and home visits *
- Specialist evaluation and management services (.67)
- Consultations (2.61)

Procedures
- Major procedures (11.86)
  - Cardiovascular
  - Orthopedic
  - Other
- Ambulatory procedures
  - Eye (.29)
  - Other (1.12)
- Minor procedures *
- Oncology services *
- Endoscopy procedures (1.37)
- Dialysis services *

Imaging
- Standard (1.34)
- Advanced (.82)
- Sonography (.72)
- Imaging procedures (2.62)

Tests
- Laboratory *
- Other *

Anesthesiology *

Other Services *

As not all of these distinctions are important for inpatient physician services, we report services using only 12 subcategories, two of which are composite subcategories. Of these, one subcategory represents major procedures (in lieu of subdividing into cardiovascular, orthopedic, and others). The other composite subcategory includes the subcategories marked by asterisks

above.[9] This composite subcategory had 4.66 RVUs per admission in the U.S. in 1991. The national average RVUs per admission for the other subcategories are in parentheses above.

As a prelude to considering volume per admission by type of service by hospital, we discuss volume by type of service statewide, as presented in Table 4. Given that Florida is 17 percent above the U. S. in overall volume, it is not surprising that the state is above the U. S. mean for many subcategories. Nationally, the mean Medicare admission had, for instance, 1.34 RVUs for standard imaging and 13.00 RVUs for hospital visits (see above). Florida admissions had 1.89 standard imaging RVUs per admission and 15.08 hospital visit RVUs per admission (not shown). (Florida figures are casemix-adjusted by type of service, as described in Appendix A.) Therefore, Florida RVUs for standard imaging were 141 percent of the U.S. mean and their RVUs for hospital visits were 116 percent of the U.S. mean (Table 4).

Figure 4 presents volume for 6 selected subcategories as a percentage of the U. S. mean. Florida is roughly 15 percent above the U. S. mean for hospital visits and consultations per admission. It is roughly at the U. S. mean for major procedures. (This may be an artifact of the casemix adjustment, in which a major procedure is often used to categorize an admission into one DRG or another.) Florida is well above national means in the three diagnostic categories shown in Figure 4: roughly 16 percent above average for endoscopies (as mentioned), 41 above average standard imaging, and 61 percent above average for advanced imaging.

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[9]A subcategory was generally put in this miscellaneous category if it had few RVUs per admission. Certain categories with high-technology services (e.g., sonography) that account for few RVUs are reported separately, because they appear to be growing rapidly. Note that although many laboratory tests are performed on inpatients, most of them are not billed as a physician service but are incorporated into the Part A payment. For imaging services performed on inpatients, in contrast, physicians can bill for the professional component.

Anesthesiology was not presented separately because of concerns over data quality.

Do those hospitals with high overall volume also have high volume in each type-of-service category, or is the high volume concentrated in certain categories? To answer this question, we identified the top 20 percent of urban hospitals in terms of overall volume and the bottom 20 percent.[10] The volume by type-of-service is presented in Figure 5 for these two groups of hospitals.

Except for major procedures, there is a considerable difference between low-volume-per-admission and high-volume hospitals. For hospital visits, for example, the bottom 20 percent of urban hospitals had RVUs that were 80 percent of the U. S. mean, whereas the top 20 percent had RVUs that were 159 percent of the U. S. mean. Endoscopies had a smaller range than hospital visits, but consultations and standard imaging had a wider range. Advanced imaging had the widest range: even the bottom 20 percent of Florida hospitals had about the same RVUs as U. S. hospitals nationally, whereas the top 20 percent had RVUs that were 264 percent of the U. S. mean.

Two patterns are noteworthy here. First, there are large differences between low-volume-per-admission and high-volume hospitals by type of service whether capital equipment is directly involved (e.g., advanced imaging) or not (e.g., hospital visits). Second, hospitals that have high volume overall tend to have high volume in many type-of-service categories. According to economic theory, one type of service might serve to substitute for another type of service--hospitals with more advanced imaging might be expected to have fewer visits or consultations. There is no evidence of substitution. Type-of-service intensities move in parallel, which could be the manifestation of differences in practice style or in severity of illness.

[10]We compare high- and low-volume hospitals in urban areas to control for the confounding factor that is involved in a comparison of urban hospitals (which tend to have high volume) to rural hospitals (which tend to have low volume).

Table 5 lists the 25 Florida hospitals with the most admissions and presents their volume by type of service. (Related methodological issues are discussed in Appendix B.) Illustrative of those data, Figure 6 presents the volume by type of service for three other Florida hospitals. Alpha Hospital has overall volume that is below the U.S. mean. Its volume is below average for three of the four type-of-service categories shown: hospital visits, consultations, and advanced imaging. Beta Hospital, typical of Florida hospitals, is above the U.S. mean for overall volume; it is above average for three of the categories but not for endoscopies. Gamma Hospital is well above the U.S. mean for overall volume. This pattern holds for three of the categories shown, but surprisingly its advanced imaging volume is below the U.S. mean.

Attending Physicians

A medical staff may want to disaggregate its casemix-adjusted volume per admission by attending physician as well as by type of service. In the former case, we assume that an attending physician is responsible (or should be) for all the services delivered to a patient. Therefore, we analyze all physician services delivered to a patient, whether provided by the attending or another physician.[11] As noted above, the advent of UPINs makes this physician-level analysis possible. Profiling individual physicians could help a medical staff determine physician practice patterns either to control costs or assure quality.[12]

[11]Because our admission records do not list the attending physician, we created an algorithm to identify the attending physician. For surgical DRGs, the physician providing the major surgery was designated the attending physician. For medical DRGs, the physician with the most RVUs for hospital visits was designated the attending physician.

[12]Alternatively, a hospital might choose to profile its physicians by specialty instead of as individuals.

To illustrate physician-level profiling, we selected a large hospital with overall volume close to the statewide mean. This hospital, called "Omega Hospital," had 72 physicians who each had 20 or more admissions in our database. Figure 7 shows seven physicians that represent the diversity of volume. (The physicians with the most extreme levels of volume are not on this chart.)

There is considerable variation of physician-level volume around the hospital mean (not shown to protect confidentiality). Some but not all of this variation represents random fluctuation at the admission level. In fact, 27 of the 72 physicians were significantly different from the hospital mean. As illustrated in Figure 7, general surgeon #1 had an volume of 34 casemix-adjusted RVUs per admission with 22 admissions and orthopedic surgeon #1 had an volume of 61 RVUs with 37 admissions. (The number of admissions are not shown in the chart.) Both were significantly different from the hospital mean ($p<.01$). Internists #1 and #2 were also significantly different from the mean; one was below the hospital mean ($p<.01$) and the other, above the hospital mean ($p<.05$).

CONCLUSION

The purpose of this paper is to develop a prototype profiling tool. We used Medicare data because its data elements are consistently defined and reported across the country. From this database we obtained all of the admissions and physician records for Medicare beneficiaries in Florida in the second half of 1991. In addition, because Medicare is national in scope, we were able to estimate a well-defined national mean against which to compare Florida hospitals and physicians. Although we use the Medicare database, our methods are adaptable to many claims databases. Certain data elements are key to this effort: a) the ability to uniquely identify

beneficiaries and providers (hospitals and physicians); b) the ability to link hospital and physician claims by beneficiary and dates of service; c) the ability to assign DRGs in order to casemix adjust; and d) the ability to measure physician services in a metric (e.g., RVUs) free of fee variation.

Profiling can be useful at several levels of aggregation. Profiling at the MSA and hospital level might be useful to national or state policymakers interested in establishing cost-containment policies (e.g., rewarding efficient medical staffs and penalizing inefficient ones), monitoring utilization rates, selecting centers of excellence, and possibly setting global budgets. A health plan may be interested in profiling at the hospital level, as a tool to monitor utilization and to negotiate provider-specific contracts.

More disaggregated levels of profiling (e.g., physicians or type of service within a hospital) may be of interest to medical staffs. If health plans develop provider-specific contracts that reward efficient hospitals and their medical staffs, medical staffs will need internal tools to control costs and maintain quality. Profiling by type-of-service and by physician would alert medical staffs to potential sources of inefficiencies, thereby enabling them to evaluate the source and appropriateness of physician service utilization.

There are at least two limitations of this profiling analysis. First, profiling needs to be extended beyond the inpatient setting. The next logical step is profiling hospital outpatient departments and ambulatory surgery centers, because these facilities involve groups of physicians that can use profiling information and because technology to casemix adjust their services is available. Second, although we have adjusted for each hospital's casemix, a hospital's patients may be more severely ill within each DRG than the average. This caveat must be kept in mind when reviewing our figures. Even in lieu of perfect data, the patterns presented here are

nonetheless insightful. The purpose of this paper is not to definitively resolve the issue of how many services are necessary for treatment but to present a prototype tool to inform discussions.

REFERENCES

[AHA] American Hospital Association (1991) American Hospital Association Guide to the Health Care Field, Chicago, IL: AHA.

Berenson, R. and J. Holahan (1992) "Sources of Growth in Medicare Physician Expenditures," JAMA 267 (February 5): 687-691.

Iezzoni, L. I., A. S. Ash, J. L. Cobb, and M. A. Moskowitz (1988) "Admission MedisGroups Score and the Cost of Hospitalizations," Medical Care 26 (November): 1068-1079.

Iezzoni, L. I., M. Shwartz, and J. Restuccia (1991) "The Role of Severity Information in Health Policy Debates: A Survey of State and Regional Concerns," Medical Care 28 (Summer): 117-128.

Lasker, R. D., D. W. Shapiro, and A. M. Tucker (1992) "Realizing the Potential of Practice Pattern Profiling," Inquiry 29 (Fall): 287-297.

Miller, M. E., and W. P. Welch (1992) "Medical Staff Risk Pools: Technical Report," Urban Institute working paper #6210-01, November.

Mitchell, J. B., K. A. Calore, and J. Cromwell (1984) "Creating DRG-based Physician Reimbursement Schemes: A Conceptual and Empirical Analysis," report to HCFA, October.

Richards, T., N. Lurie, W. H. Rodgers, and R. H. Brook (1988) "Case-mix Adjustments: A Quantitative Evaluation of Alternative Measures at the Patient Level," Medical Care 26 (Supplement): S94-S191.

Welch, W. P., M. E. Miller, H. G. Welch, et al. (1993) "The Variation in Expenditures for Physicians' Services Across the United States: Inpatient and Outpatient Services," New England Journal of Medicine 328 (March 4): 621-627.

Wennberg, J.E. (1984) "Dealing with Medical Practice Variations: A Proposal for Action," Health Affairs 3 (Summer):6-32.

APPENDIX A: Technical Issues

Averaging Admissions and Casemix Adjusting

We wish to define "casemix-adjusted RVUs per admission," but there are two ways to average volume across admissions. For the first average, one calculates the average RVUs per admission for a hospital and its average relative weight per admission (casemix index). One then takes the ratio of the two averages:

$$(\Sigma R_i/n)/(\Sigma w_i/n) = \Sigma R_i/\Sigma w_i$$

where R_i is the RVUs of the ith admission, w_i is the relative weight of the ith admission, and n is the number of admissions in the hospital. This paper uses this average.

The second average involves the ratio for each admission of RVUs and relative weights. This ratio is then averaged over all admissions in the hospital:

$$\Sigma (R_i/w_i)/n$$

This ratio can be described as the casemix-adjusted RVUs, averaged over a hospital's admissions.

Actually, the first average is also an average of a hospital's admissions, only in this case each admission is weighted by the weight of its DRG:

$$[\Sigma (R_i/w_i) w_i]/\Sigma w_i = \Sigma R_i/\Sigma w_i$$

Note that if each admission has the same weight (w_i=c), this average simplifies to the second average.

More concretely, the second measure gives the same weight to admissions that had, say, 10 percent more RVUs than what is typical for its DRG. For instance, a heart failure admission might have 2 RVUs extra, whereas a bowel procedure admission might have 9 RVUs extra, even though both admissions would be about 10 percent above their DRG's average. The first measure, implicitly using relative weights, recognizes these differences by DRG. Therefore, we believe the first measure is conceptually superior.

Casemix adjustment is algebraically equivalent to indirect standardization, a basic epidemiological technique. Consider the adjustment of admission rates for age and sex. Indirect standardization entails dividing the actual number of admissions by expected number of admissions, which is the product of national admission rates by age-sex cells and the number of people in those cells. In lieu of age-sex cells, casemix adjustment uses DRGs. So casemix adjustment entails dividing the actual number of RVUs by the expected number, which is the product of national RVUs per admission by DRG and the number of admissions by DRG.

At times it is useful to calculate a hospital's casemix index for physician services (see Table 3). Casemix is defined above as $\Sigma w_i/n$. Because each weight (w_i) is the expected RVUs (for a given DRG) divided by the national average RVUs per admission across all DRGs, this definition is equivalent to a hospital's expected RVUs per admission (given its DRGs) divided by the national average RVUs per admission.

Significance Testing

Significance testing, although standard in research publications, may appear a bit out of place in a discussion of a practical tool such as profiling. However, physicians intuitively understand that an estimate of their volume per admission based on a few admissions may be the result of randomness at the admission level and may not represent any underlying phenomenon. By performing significance tests, we can demonstrate with, say, a 95-percent level of confidence that measured differences are real.

For significance testing, consider a variable x_i with the above weight of w_i. The mean estimator of x_i is calculated as

$$M = (\Sigma x_i w_i)/\Sigma w_i$$

The standard error squared is calculated as

$$S^2 = \phi [\Sigma w_i (x_i - M)^2]$$

where $\phi = 1/((\Sigma w_i)(n-1))$.

Now let x_i equal R_i/w_i. Substituting R_i/w_i into the above equation yields a mean estimator of

$$M = \Sigma R_i/\Sigma w_i$$

If R_i/w_i is substituted into the last equation, we have

$$S^2 = \phi [\Sigma w_i ((R_i/w_i) - X)^2]$$

Rearranging this yields

$$S^2 = \phi [(\Sigma (R_i^2/w_i)) - (M^2 \Sigma w_i)]$$

Then calculating the t-value is straightforward.

Working with large databases (with several 100,000 admissions), we have found it more efficient to sum admissions to the hospital level and then perform significance tests and other calculations using summations. Calculating the standard error requires three summations for a hospital: ΣR_i, Σw_i, and $\Sigma (R_i^2/w_i)$. The first two are necessary just to calculate the mean.

Casemix Adjusting by Type of Service

Casemix adjusting RVUs by type of service is not straightforward. Suppose we divided major procedure RVUs by the overall casemix index. A hospital with a high proportion of medical DRGs would appear to have few casemix-adjusted major procedure RVUs per admission, merely because medical DRGs involve relatively few major procedures. Therefore, using a national file in 1989, we calculated mean RVUs per admission by DRG by type of service. For instance, DRG 127 (Heart Failure and Shock) has 13.59 RVUs for hospital visits and 1.36 RVUs for standard imaging.

We attached these national averages to each admission according to its DRG. For each admission for each of the 12 type-of-service subcategories, we had the actual RVUs and the national mean RVUs for that admission's DRG. Taking hospital visits as an example, for each hospital we summed both actual RVUs and the nationally expected RVUs. For each subcategory, the ratio of actual RVUs to the national RVUs represents casemix-adjusted RVUs per admission (as a percentage of the U.S. mean).

More formally, let $R_{c,j}$ be the sum of the RVUs in the cth TOS category in the jth hospital and $w_{c,j}$ be the sum of the analogous weights. (When we casemix-adjusted RVUs aggregated across TOS categories, we used relative weights. Here we casemix-adjust RVUs by using absolute weights, that is, national means.) Ignoring the issue of different years of data for the moment, a hospital's casemix-adjusted RVUs per admission by TOS (as a percentage of the U.S. mean) is calculated as $R_{c,j}/w_{c,j}$. Like indirect standardization, the numerator represents actual RVUs, and the denominator, expected RVUs. More precisely, $w_{c,j}$ represents the national average RVUs by TOS for the casemix of the jth hospital.

Because our TOS data for Florida pertains to 1991 but the weights reflect national patterns in 1989, we need to adjust for changes in RVUs between 1989 and 1991 (i.e., "ageing" the data). From a national file for 1991, we calculated $R_{c,US}/w_{c,US}$, which represents one plus the 1989-91 growth rate of RVUs in the cth TOS category. So a hospital's volume by TOS in 1991

was calculated as $[R_{c,j}/w_{c,j}]/[R_{c,US}/w_{c,US}]$, where both RVU variables pertain to 1991 and both weight variables pertain to 1989.

It is important to note an inherent awkwardness with presenting data on casemix adjustment by TOS (e.g., in Table 4). For simplicity, suppose that our data did not require "ageing," so that casemix-adjusted RVUs per admission by TOS was simply calculated as $R_{c,j}/w_{c,j}$. The sum of these ratios across TOS categories $[\Sigma_c (R_{c,j}/w_{c,j}]$ for the jth hospital is not necessarily equal to the ratio of the sums $[(\Sigma_c R_{c,j})/(\Sigma_c w_{c,j})]$. Along similar lines, the text lists the U.S. RVUs per admission by TOS category. These figures sum to 41.08, which does not equal the U.S. mean in Table 1 (39.3). Because of this awkwardness, Table 4 presents Florida RVUs as a ratio of U.S. RVUs and not absolute RVU figures.

Databases

It is useful to summarize the three databases used in this paper. From the National Claims History File, we obtained all the claims for a 100-percent of Florida beneficiaries in the second half of 1991. For each beneficiary, physician claims were linked to admission claims and summed to the hospital level (and other levels). The 1989 BMAD (a 5-percent beneficiary file) was used to create the two sets of weights for casemix adjustment. One set was used to casemix adjust aggregate RVUs, and the other set was used to casemix adjust RVUs by type of service. Finally, a 5-percent beneficiary file from the 1991 NCHF was used to "age" the weights. Aggregate RVUs per admission increased between 1989 and 1991, and RVUs changed differentially by TOS category. We used aggregate changes between 1989 and 1991 to modify the casemix adjustors.

APPENDIX B: Volume per Admission by Type of Service, by Hospital

Tables 5A, 5B, and 5C are prototypic and present physician services by type of service for Florida hospitals. Except for the first variable, the volume variables are as a percentage of the Florida mean. This would enable a state-based organization to compare each Florida hospital to the statewide mean. For other purposes, it might be more useful to normalize these figures to the national mean.

The development of a prototypic profiling tool raises issues of physician confidentiality. Because our primary goal is to develop a tool rather than produce all possible results, we have opted to suppress certain TOS cells. Disaggregation of physician services by type-of-service within a hospital raises the possibility that only a few physicians may perform all of the services within a type-of-service category. Our dataset enables us to identify physicians through UPINs, thereby enabling us to calculate the percentage of RVUs within each type-of-service category that were delivered by each physician. In most Florida hospitals only few physicians perform most or all of the services within two categories: eye procedures and specialist evaluation and management services. Although Table 4 presents statewide data on these categories, they are dropped from the hospital-level data of Table 5.

Additionally, we devised a simple rule: whenever one physician delivered more than 40 percent of the RVUs in a given category in a given hospital, we suppress information on that category for that hospital. The logic of this rule is as follows: If one physician delivered 40 percent of the RVUs, at least three physicians would have delivered services within that category, and no single physician would have delivered a majority of the services.

In addition to confidentiality, there is an issue of precision. Most hospitals have enough admissions in our database for the volume-per-admission estimates to be fairly precise. In fact, the t-values in Table 2 indicate 87 percent of Florida hospitals are significantly different from the U.S. mean. However, for a given hospital, we may have statistical power for overall volume but not for a specific TOS category for which that hospital had few expected RVUs. For instance, a hospital without a cardiac catheterization laboratory probably admits few patients who need an imaging procedure. To illustrate the technique without presenting imprecise estimates, we present estimates on volume at the TOS-level only for the 25 hospitals with the most admissions. Each of these hospitals had at least 2,000 admissions in our database.

In Tables 5A, 5B, and 5C, the first hospital listed is Boca Raton Community Hospital. It had 47.2 RVUs per admission, which was 103 percent of the Florida mean. This mean is the weighted sum of the volume of total procedures, total imaging, total evaluation and management, and other. The total volume of 103 percent of the Florida mean is driven by intensities of 110 percent for procedures (Table 5A), 86 percent for imaging (Table 5B), and 111 percent for evaluation and management services (Table 5C). Table 5A breaks down the procedure volume of 110 percent of the Florida mean into 111 percent for major procedures, 94 percent for other ambulatory procedures, and 109 percent for endoscopy. As noted, data on eye procedures are not reported here.

Table 5B represents volume for the four imaging subcategories. From an AHA file we included three variables pertaining to imaging equipment, indicating whether a hospital has a CT scan, an MRI unit, and a cardiac catheterization laboratory. (Because these data pertain to 1990, some hospitals may have added such equipment since 1990.) In Florida 86 percent of hospitals had an CT scanner, 25 percent an MRI unit, and 47 percent a cardiac catheterization laboratory.

Boca Raton Community Hospital, with a CT scanner but without an MRI machine, had advanced imaging RVUs per admission of 57 percent of the state mean. This hospital, also having a cardiac catheterization laboratory, had imaging procedure casemix-adjusted RVUs per admission of 122 of the state mean.

Table 5C represents volume for the remaining type-of-service categories. Prominent among these is evaluation and management services, which is broken down here into hospital visits and consultations. As noted, data on specialist evaluation and management services are not reported here. The remaining services are placed into an "other services" category.

Table 1. Metropolitan Areas Ranked by Volume per Admission, Florida

Metropolitan Statistical Area	Volume*	Expenditure per Admission**	Number of Hospitals
Miami	53.9	$1671	26
Fort Lauderdale	53.1	$1645	18
Fort Pierce	51.2	$1588	3
West Palm Beach	49.1	$1521	14
Tampa - St.Petersburg	46.5	$1442	36
Orlando	45.9	$1423	11
Fort Meyers	45.3	$1404	4
Bradenton	45.1	$1399	2
Melbourne	44.9	$1390	4
Panama City	44.8	$1388	2
Jacksonville	44.0	$1364	14
Ocala	43.8	$1357	2
Sarasota	41.4	$1282	3
Naples	41.2	$1276	1
Gainesville	40.5	$1256	4
Tallahassee	40.4	$1252	3
Pensacola	39.7	$1232	7
Rural Florida	39.4	$1222	36
Fort Walton Beach	38.1	$1182	4
Daytona Beach	37.8	$1170	7
Lakeland	36.3	$1126	6
Florida Mean	45.8	$1420	207
U.S. Mean	39.3	$1218	4966

* Volume of physician services -- Casemix-adjusted RVUs per admission, 1991.
** Volume times $31 (Medicare 1992 conversion factor).

OBS	Hospital	MSA	Volume*	Admissions in Database	T-value#	Teaching Status	Disproportionate Share Status	Number of Beds
1	SOUTH SHORE HOSP & MED CENTER	Miami	65.3	611	10.50	Minor	Yes	153
2	GOLDEN GLADES REG MEDICAL CTR	Miami	64.8	247	5.28	Non	Yes	352
3	HCA HARBOUR SHORES	Fort Pierce	63.0	1393	11.97	Non	Yes	275
4	WEST BOCA MEDICAL CENTER	Miami	62.0	1893	14.72	Non	No	430
5	AMI KENDALL REG MEDICAL CENTER	Miami	61.0	1522	12.13	Non	Yes	332
6	CORAL GABLES HOSPITAL	Miami	60.4	1697	11.59	Non	Yes	218
7	ST AUGUSTINE PSYCH CENTER	Fort Lauderdale	59.9	2190	14.08	Non	No	560
8	MIAMI HEART INSTITUTE	Miami	58.8	1320	10.67	Non	No	258
9	LARKIN GENERAL HOSPITAL	Miami	58.3	135	3.22	Minor	No	90
10	FLORIDA MEDICAL CENTER HOSP	Fort Lauderdale	58.3	2228	13.78	Non	No	459
11	HIALEAH HOSPITAL	Miami	58.3	991	8.48	Non	Yes	446
12	UNIVERSITY HOSPITAL	Fort Lauderdale	57.9	1603	10.97	Non	No	249
13	HOLLYWOOD MEDICAL CENTER	Fort Lauderdale	57.5	1012	8.45	Non	No	334
14	HUMANA HOSPITAL-PEMBROKE	Fort Lauderdale	57.5	561	5.77	Minor	No	300
15	PALM SPRINGS GENERAL HOSPITAL	Miami	57.1	1153	7.11	Non	Yes	250
16	CLEARWATER COMMUNITY HOSPITAL	Tampa-St. Petersburg	56.8	677	6.72	Non	No	120
17	MEDICAL CENTER HOSPITAL	Rural	55.5	963	5.26	Non	No	156
18	MOUNT SINAI MEDICAL CENTER	Miami	55.5	2432	11.90	Minor	No	659
19	ST FRANCIS HOSPITAL	Miami	55.1	986	6.62	Non	No	260
20	WELLINGTON REG MEDICAL CENTER	West Palm Beach	55.0	293	4.17	Minor	No	120
21	AMI TOWN & COUNTRY HOSPITAL	Tampa-St. Petersburg	54.6	601	5.99	Non	Yes	143
22	SOUTH MIAMI HOSPITAL	Miami	54.2	1293	7.53	Non	No	520
23	HCA NORTHWEST REGIONAL HOSP	Fort Lauderdale	54.0	850	5.70	Minor	No	172
24	HUMANA HOSPITAL-BRANDON	Tampa-St. Petersburg	53.7	1190	5.87	Non	No	220
25	HUMANA HOSPITAL-NORTHSIDE	Tampa-St. Petersburg	53.6	987	5.94	Non	No	301
26	PLANTATION GENERAL HOSPITAL	Fort Lauderdale	53.5	751	5.48	Non	No	294
27	WOMEN'S MEDICAL CENTER	Tampa-St. Petersburg	53.3	27	1.12	Non	No	99
28	NORTH SHORE MEDICAL CENTER	Miami	53.2	891	5.08	Non	No	337
29	AMI PALM BEACH GARDENS MED CTR	West Palm Beach	53.1	1175	7.06	Non	No	196
30	PAN AMERICAN HOSPITAL	Miami	52.8	1097	6.29	Non	Yes	146
31	HOLY CROSS HOSPITAL	Fort Lauderdale	52.8	1995	8.41	Non	No	420
32	HUMANA HOSPITAL-KISSIMMEE	Orlando	52.2	705	4.19	Non	No	181
33	MERCY HOSPITAL	Miami	51.9	2231	6.80	Minor	Yes	390
34	HCA NEW PORT RICHEY HOSPITAL	Tampa-St. Petersburg	51.4	3205	9.23	Non	No	418
35	JAMES ARCHER SMITH HOSPITAL	Miami	51.1	342	2.41	Non	Yes	120
36	DELRAY COMMUNITY HOSPITAL	West Palm Beach	51.1	2065	7.26	Non	No	211
37	CEDARS MEDICAL CENTER	Miami	51.0	1470	3.05	Minor	Yes	432
38	PALM BEACH REGIONAL HOSPITAL	West Palm Beach	50.9	737	3.61	Non	No	199
39	AMI PALMETTO GENERAL HOSPITAL	Miami	50.9	1278	4.55	Non	Yes	112
40	UNIVERSAL MEDICAL CENTER	Fort Lauderdale	50.8	530	3.00	Minor	No	198
41	GOOD SAMARITAN HOSPITAL	West Palm Beach	50.7	1191	4.82	Non	No	382
42	SOUTH FLORIDA BAPTIST HOSPITAL	Tampa-St. Petersburg	50.6	565	3.25	Non	Yes	132
43	HUMANA HOSPITAL-BENNETT	Fort Lauderdale	50.4	941	3.44	Non	No	204
44	DOCTORS HOSPITAL OF HOLLYWOOD	Fort Lauderdale	50.3	392	2.82	Non	No	124
45	PALMS WEST HOSPITAL	West Palm Beach	50.0	315	1.95	Non	No	112
46	NORTH BROWARD MEDICAL CENTER	Fort Lauderdale	49.9	1434	3.56	Non	No	419
47	ST JOSEPH'S HOSPITAL	Tampa-St. Petersburg	49.8	3443	6.79	Minor	Yes	607
48	HUMANA HOSPITAL-PALM BEACHES	West Palm Beach	49.8	468	2.25	Minor	No	162
49	SUN COAST HOSPITAL	Tampa-St. Petersburg	49.6	907	2.91	Minor	No	223
50	UNIVERSITY COMMUNITY HOSPITAL	Tampa-St. Petersburg	49.6	1688	4.45	Non	No	271
51	BAPTIST MEDICAL CENTER	Jacksonville	49.5	1317	3.97	Minor	No	542
52	JFK MEDICAL CENTER	West Palm Beach	49.5	1851	4.65	Non	No	285

* Volume of physician services -- Casemix-adjusted RVUs per admission, 1991
\# Testing whether a hospital's volume is different from the statewide mean

OBS	Hospital	MSA	Volume*	Admissions in Database	T-value#	Teaching Status	Disproportionate Share Status	Number of Beds
53	AMI MEDICAL CENTER ORLANDO	Orlando	49.5	391	1.77	Non	Yes	153
54	JUPITER HOSPITAL	West Palm Beach	49.5	974	3.53	Non	No	156
55	RIVERSIDE HOSPITAL	Tampa-St. Petersburg	49.4	787	3.19	Non	No	124
56	MANATEE MEMORIAL HOSPITAL	Bradenton	49.3	2229	4.91	Non	Yes	512
57	HUMANA HOSPITAL-SOUTH BROWARD	Fort Lauderdale	48.7	97	0.83	Minor	Yes	256
58	METROPOLITAN GENERAL HOSPITAL	Tampa-St. Petersburg	48.7	532	1.89	Minor	No	154
59	VICTORIA HOSPITAL	Miami	48.6	922	2.38	Non	Yes	260
60	MORTON F PLANT HOSPITAL	Tampa-St. Petersburg	48.6	4000	5.59	Non	No	713
61	HCA MED CTR OF PORT ST LUCIE	Fort Pierce	48.5	1331	2.90	Non	No	150
62	HCA CENTRAL FLORIDA REG HOSP	Orlando	48.1	1299	2.33	Non	Yes	226
63	HUMANA HOSPITAL-BISCAYNE	Miami	47.9	1366	2.04	Non	No	373
64	IMPERIAL POINT MEDICAL CENTER	Fort Lauderdale	47.9	470	1.43	Non	Yes	107
65	DOCTORS' HOSPITAL OF TAMPA	Tampa-St. Petersburg	47.8	308	0.99	Non	Yes	102
66	ST AUGUSTINE GENERAL HOSPITAL	Jacksonville	47.8	313	1.07	Non	No	115
67	BROWARD GENERAL MEDICAL CENTER	Fort Lauderdale	47.7	1206	1.55	Minor	Yes	611
68	ST CLOUD HOSPITAL	Orlando	47.4	548	0.97	Non	No	84
69	MEMORIAL HOSPITAL-FLAGLER	Rural	47.3	240	0.62	Non	No	81
70	BOCA RATON COMMUNITY HOSPITAL	West Palm Beach	47.2	3284	2.35	Non	No	382
71	BAY MEDICAL CENTER	Panama City	47.2	1718	1.48	Non	Yes	262
72	HUMANA WOMEN'S HOSPITAL-TAMPA	Tampa-St. Petersburg	47.1	85	0.45	Non	No	303
73	PALMS OF PASADENA HOSPITAL	Tampa-St. Petersburg	47.0	2022	1.64	Non	No	310
74	ST LUKE'S HOSPITAL	Jacksonville	47.0	1509	1.49	Minor	Yes	289
75	FAWCETT MEMORIAL HOSPITAL	Rural	47.0	1809	1.48	Non	No	254
76	WUESTHOFF HOSPITAL	Melbourne	46.9	1425	1.13	Non	No	303
77	ST MARY'S HOSPITAL	West Palm Beach	46.7	1264	0.88	Non	Yes	388
78	HUMANA HOSPITAL-LUCERNE	Orlando	46.6	1006	0.75	Non	No	232
79	BETHESDA MEMORIAL HOSPITAL	West Palm Beach	46.6	1427	0.85	Non	No	383
80	HUMANA HOSPITAL-CYPRESS	Fort Lauderdale	46.6	386	0.41	Non	No	273
81	HCA OAK HILL HOSPITAL	Tampa-St. Petersburg	46.5	1937	1.04	Non	No	96
82	SOUTHWEST FLORIDA REG MED CNTR	Fort Meyers	46.5	2971	1.22	Non	No	400
83	MEM MED CNTR OF JACKSONVILLE	Jacksonville	46.5	2063	0.91	Minor	No	356
84	AMI MEMORIAL HOSPITAL OF TAMPA	Tampa-St. Petersburg	46.4	1067	0.50	Non	Yes	140
85	PARRISH MEDICAL CENTER	Melbourne	46.3	922	0.43	Non	No	210
86	SHANDS HOSPITAL	Gainesville	46.2	1155	0.31	Major	Yes	548
87	FLORIDA HOSPITAL MEDICAL CTR	Orlando	46.2	6220	0.74	Minor	No	979
88	LEE MEMORIAL HOSPITAL	Fort Meyers	46.1	2795	0.40	Non	Yes	640
89	ORLANDO REGIONAL MED CENTER	Orlando	45.9	2764	0.11	Minor	Yes	712
90	GLENBEIGH HOSPITAL OF MIAMI	Tampa-St. Petersburg	45.9	1453	0.06	Minor	Yes	400
91	MARTIN MEMORIAL HOSPITAL	Fort Pierce	45.7	2315	-0.22	Non	No	336
92	HCA BAYONET POINT-HUDSON CTR	Tampa-St. Petersburg	45.5	2342	-0.53	Non	No	200
93	CENTURION HOSP OF CARROLLWOOD	Tampa-St. Petersburg	45.5	325	-0.22	Minor	No	120
94	UNIVERSITY GENERAL HOSPITAL	Tampa-St. Petersburg	45.5	678	-0.30	Minor	No	140
95	DOCTORS' HOSPITAL	Miami	45.3	737	-0.35	Non	No	285
96	METHODIST MEDICAL CNTR	Jacksonville	45.3	1550	-0.69	Non	Yes	216
97	NORTH RIDGE MEDICAL CTR	Fort Lauderdale	44.8	1880	-1.62	Non	No	318
98	UNIVERSITY HOSPITAL & CLINIC	Pensacola	44.8	151	-0.45	Minor	Yes	130
99	EAST POINTE HOSPITAL	Fort Meyers	44.7	634	-1.04	Non	No	88
100	HOLMES REGIONAL MEDICAL CENTER	Melbourne	44.5	3636	-2.51	Non	No	467
101	MUNROE REGIONAL MEDICAL CENTER	Ocala	44.4	2075	-2.32	Non	No	283
102	ST JOSEPH HOSPITAL	Rural	44.4	1285	-1.73	Non	No	212
103	NORTH BEACH HOSPITAL	Fort Lauderdale	44.3	615	-0.94	Non	No	153
104	HUMANA HOSPITAL-ORANGE PARK	Jacksonville	44.3	1509	-1.92	Non	No	218

* Volume of physician services -- Casemix-adjusted RVUs per admission, 1991
\# Testing whether a hospital's volume is different from the statewide mean

OBS	Hospital	MSA	Volume*	Admissions in Database	T-value#	Teaching Status	Disproportionate Share Status	Number of Beds
105	INDIAN RIVER MEMORIAL HOSPITAL	Rural	44.3	1869	-2.16	Non	No	293
106	ST VINCENT'S MEDICAL CENTER	Jacksonville	44.3	2496	-2.29	Minor	No	484
107	SEVEN RIVERS COMMUNITY HOSP	Rural	44.1	1330	-2.09	Non	No	90
108	MEASE HOSPITAL COUNTRYSIDE	Tampa-St. Petersburg	44.1	973	-1.95	Non	No	100
109	FLAGLER HOSPITAL	Jacksonville	43.8	853	-2.04	Non	Yes	131
110	HCA TALLAHASSEE COMM HOSPITAL	Tallahassee	43.5	965	-2.50	Non	Yes	180
111	DEERING HOSPITAL	Miami	43.5	577	-1.63	Non	Yes	135
112	JACKSONVILLE MEDICAL CENTER	Jacksonville	43.3	324	-1.37	Minor	Yes	107
113	KISSIMMEE MEMORIAL HOSPITAL	Orlando	43.3	561	-2.07	Non	No	120
114	SUN BAY MEDICAL CENTER	Tampa-St. Petersburg	43.2	303	-1.48	Non	No	200
115	BAPTIST HOSPITAL	Pensacola	43.2	1506	-2.99	Minor	Yes	436
116	HELEN ELLIS MEMORIAL HOSPITAL	Tampa-St. Petersburg	43.2	1299	-3.81	Non	No	150
117	HCA MARION COMMUNITY HOSPITAL	Ocala	43.2	2446	-4.55	Non	No	190
118	CAPE CORAL HOSPITAL	Fort Meyers	42.8	2185	-5.44	Non	No	174
119	PENINSULA MEDICAL CENTER	Daytona Beach	42.7	479	-1.94	Minor	Yes	119
120	SARASOTA MEMORIAL HOSPITAL	Sarasota	42.6	4726	-7.92	Non	No	626
121	HCA DOCTORS HOSP OF SARASOTA	Sarasota	42.3	1219	-4.66	Non	No	147
122	WINTER PARK MEMORIAL HOSPITAL	Orlando	42.3	1360	-4.48	Non	No	301
123	HCA LARGO MED CENTER HOSPITAL	Tampa-St. Petersburg	42.3	2301	-6.37	Non	No	256
124	SOUTH SEMINOLE COMM HOSPITAL	Orlando	42.1	452	-2.67	Non	No	100
125	ALACHUA GENERAL HOSPITAL	Gainesville	42.0	1786	-5.44	Minor	Yes	407
126	HUMANA HOSP-FORT WALTON BEACH	Fort Walton Beach	41.9	1023	-4.27	Non	Yes	199
127	FLORIDA HOSP OF ST PETERSBURG	Tampa-St. Petersburg	41.8	36	-0.81	Non	Yes	108
128	LAKE SHORE HOSPITAL	Rural	41.7	337	-2.32	Non	Yes	128
129	HCA L W BLAKE HOSPITAL	Bradenton	41.5	2557	-8.58	Non	No	355
130	HCA RAULERSON HOSPITAL	Rural	41.4	661	-4.68	Non	No	101
131	HUMANA HOSPITAL-SEBASTIAN	Rural	41.3	787	-4.65	Non	No	123
132	HIGHLANDS REGIONAL MED CENTER	Rural	41.3	1108	-4.92	Non	No	126
133	SACRED HEART HOSP OF PENSACOLA	Pensacola	41.3	1862	-7.72	Minor	Yes	375
134	MARINERS HOSPITAL	Rural	41.2	224	-2.69	Non	No	42
135	HCA GULF COAST HOSPITAL	Panama City	41.2	1164	-5.51	Non	No	176
136	NAPLES COMMUNITY HOSPITAL	Naples	41.2	2788	-9.18	Non	No	446
137	EDWARD WHITE HOSPITAL	Tampa-St. Petersburg	41.1	1063	-6.21	Non	No	167
138	ST ANTHONY'S HOSPITAL	Tampa-St. Petersburg	41.1	2016	-8.50	Non	No	386
139	HUMANA HOSPITAL-ST PETERSBURG	Tampa-St. Petersburg	41.0	981	-5.52	Non	No	219
140	WATERMAN MEDICAL CENTER	Rural	41.0	1275	-6.31	Non	No	162
141	TALLAHASSEE MEM REG MED CENTER	Tallahassee	40.7	2284	-8.42	Minor	Yes	598
142	HUMANA HOSPITAL-PASCO	Tampa-St. Petersburg	40.6	395	-3.79	Non	No	124
143	MEASE HOSPITAL DUNEDIN	Tampa-St. Petersburg	40.5	1343	-7.77	Non	No	289
144	CAPE CANAVERAL HOSPITAL	Melbourne	40.4	709	-5.32	Non	No	136
145	NORTH GABLES HOSPITAL	Miami	40.3	445	-4.30	Non	Yes	53
146	HCA TWIN CITIES HOSPITAL	Fort Walton Beach	40.3	288	-3.10	Non	No	64
147	SOUTH BAY HOSPITAL	Tampa-St. Petersburg	40.1	848	-5.56	Non	No	112
148	HUMANA HOSPITAL-DAYTONA BEACH	Daytona Beach	40.0	435	-4.22	Non	Yes	147
149	JACKSON MEMORIAL HOSPITAL	Miami	40.0	1110	-4.21	Major	Yes	1485
150	CITRUS MEMORIAL HOSPITAL	Rural	39.5	1787	-10.51	Non	No	171
151	BAPTIST MEDICAL CENTER-BEACHES	Jacksonville	38.9	405	-4.58	Non	No	82
152	HALIFAX HOSPITAL MEDICAL CNTR	Daytona Beach	38.9	1532	-9.62	Minor	Yes	505
153	WALKER MEMORIAL HOSPITAL	Rural	38.8	1077	-9.11	Non	No	133
154	BROOKSVILLE REGIONAL HOSPITAL	Tampa-St. Petersburg	38.8	978	-8.55	Non	No	173
155	EAST PASCO MEDICAL CENTER	Tampa-St. Petersburg	38.5	824	-9.05	Non	No	1050
156	VENICE HOSPITAL	Sarasota	38.5	2374	-14.51	Non	No	317

* Volume of physician services -- Casemix-adjusted RVUs per admission, 1991
\# Testing whether a hospital's volume is different from the statewide mean

OBS	Hospital	MSA	Volume*	Admissions in Database	T-value#	Teaching Status	Disproportionate Share Status	Number of Beds
157	FISHERMEN'S HOSPITAL	Rural	38.5	236	-3.84	Non	No	58
158	RIVERSIDE HOSPITAL	Jacksonville	38.4	624	-6.04	Non	No	193
159	HCA PUTNAM COMMUNITY HOSPITAL	Rural	38.4	1157	-10.87	Non	No	120
160	LAKELAND REGIONAL MED CENTER	Lakeland	38.0	3917	-19.89	Non	No	162
161	MEMORIAL HOSPITAL-ORMOND BEACH	Daytona Beach	37.9	1177	-12.86	Non	No	205
162	HCA NORTH FLORIDA REG MED CTR	Gainesville	37.8	2436	-15.69	Non	No	267
163	WINTER HAVEN HOSPITAL	Lakeland	37.7	2620	-17.77	Non	No	271
164	WEST FLORIDA REGIONAL MED CTR	Pensacola	37.2	1859	-16.19	Minor	No	387
165	H LEE MOFFITT CANCER CENTER	Tampa-St. Petersburg	36.9	454	-6.91	Major	No	65
166	EVERGLADES MEMORIAL HOSPITAL	West Palm Beach	36.8	93	-3.42	Non	Yes	92
167	LEESBURG REGIONAL MED CENTER	Rural	36.5	1877	-18.85	Non	No	132
168	CHARTER HOSPITAL ORLANDO SOUTH	Orlando	36.3	365	-7.16	Non	Yes	158
169	UNIV OF MIAMI HOSP & CLINICS	Miami	36.1	73	-2.40	Minor	No	40
170	SANTA ROSA MEDICAL CENTER	Pensacola	36.0	462	-9.45	Non	Yes	153
171	GLADES GENERAL HOSPITAL	West Palm Beach	35.8	144	-4.32	Non	No	81
172	WEST VOLUSIA MEMORIAL HOSPITAL	Daytona Beach	35.8	784	-12.27	Non	No	162
173	GULF BREEZE HOSPITAL	Pensacola	35.5	268	-8.48	Non	No	60
174	BASCOM PALMER EYE INST & HOSP	Miami	35.4	228	-9.09	Major	Yes	100
175	HUMANA HOSPITAL-DESTIN	Fort Walton Beach	35.3	193	-6.78	Non	No	25
176	UNIVERSITY MEDICAL CENTER	Jacksonville	34.7	1109	-12.04	Major	Yes	434
177	FISH MEM HOSPITAL AT DELAND	Daytona Beach	34.3	397	-10.69	Non	No	71
178	FISH MEMORIAL HOSPITAL	Daytona Beach	33.7	589	-16.76	Non	No	126
179	NASSAU GENERAL HOSPITAL	Jacksonville	33.2	277	-11.47	Non	No	54
180	SOUTH LAKE MEMORIAL HOSPITAL	Rural	32.6	262	-10.79	Non	No	64
181	JACKSON HOSPITAL	Rural	32.6	619	-15.15	Non	Yes	107
182	BARTOW MEMORIAL HOSPITAL	Lakeland	32.4	204	-8.47	Non	No	56
183	ED FRASER MEMORIAL HOSPITAL	Rural	32.2	83	-5.00	Non	No	25
184	JAY HOSPITAL	Pensacola	32.2	166	-9.67	Non	No	60
185	NORTH OKALOOSA MEDICAL CTR	Fort Walton Beach	31.2	557	-18.49	Non	Yes	110
186	CLAY MEMORIAL HOSPITAL	Jacksonville	30.3	134	-8.17	Non	No	60
187	HARDEE MEMORIAL HOSPITAL	Rural	29.1	124	-9.48	Non	No	50
188	LAKE BUTLER HOSP SURG CENTER	Rural	28.4	75	-5.10	Non	No	27
189	HEART OF FLORIDA HOSPITAL	Lakeland	28.3	301	-17.83	Non	No	51
190	DESOTO MEMORIAL HOSPITAL	Rural	27.4	331	-22.49	Non	No	82
191	HENDRY GENERAL HOSPITAL	Rural	27.3	165	-12.75	Non	No	66
192	LAKE WALES HOSPITAL ASSN	Lakeland	26.6	428	-25.35	Non	No	154
193	SUWANNEE HOSPITAL	Rural	26.0	126	-8.29	Non	No	60
194	WALTON REGIONAL HOSPITAL	Rural	24.7	237	-21.40	Non	No	40
195	LAKE CITY MEDICAL CENTER	Rural	24.7	434	-24.81	Non	No	75
196	DOCTORS MEMORIAL HOSPITAL	Rural	24.4	181	-16.91	Non	Yes	34
197	POLK GENERAL HOSPITAL	Lakeland	24.2	238	-18.15	Non	Yes	180
198	WILLISTON MEMORIAL HOSPITAL	Rural	24.1	131	-15.39	Non	No	40
199	DOCTORS MEMORIAL HOSPITAL	Rural	23.3	52	-9.06	Non	No	48
200	HAMILTON COUNTY MEM HOSPITAL	Rural	23.2	145	-17.78	Non	No	42
201	NORTHWEST FLORIDA COMM HOSP	Rural	22.5	333	-27.96	Non	No	45
202	GULF PINES HOSPITAL	Rural	21.6	181	-23.38	Non	No	45
203	BRADFORD HOSPITAL	Gainesville	21.6	132	-21.08	Non	No	54
204	CAMPBELLTON GRACEVILLE HOSP	Rural	19.9	147	-31.15	Non	No	50
205	GADSDEN MEMORIAL HOSPITAL	Tallahassee	19.8	180	-29.30	Non	Yes	63
206	MADISON COUNTY MEM HOSPITAL	Rural	19.0	146	-28.27	Non	Yes	42
207	CALHOUN GENERAL HOSPITAL	Rural	18.3	198	-40.46	Non	No	36

* Volume of physician services -- Casemix-adjusted RVUs per admission, 1991

\# Testing whether a hospital's volume is different from the statewide mean

Table 3

Volume per Admission by Hospital Type, Florida

Hospital Type	Volume*	Volume* as a Percent of the Florida Mean	Casemix	Number of Hospitals
Statewide	45.8	100%	1.11	207
Bed Size				
< 50	26.1	57	0.66	16
50-100	39.6	86	0.89	31
101-200	43.7	95	1.03	69
201-300	47.8	104	1.22	35
301-500	47.2	100	1.22	39
> 500	47.2	100	1.27	17
Urban/Rural Location				
Rural	39.3	86	0.91	39
Other Urban	44.4	97	1.16	94
Large Urban	39.7	109	1.03	76
Teaching Status				
Nonteaching	45.7	100	1.16	168
Minor	46.8	100	1.19	34
Major	39.7	87	1.22	5
Disproportionate Share Status				
No	46.3	99	1.12	147
Yes	47.0	103	1.06	60

* Volume of physician services -- Casemix-adjusted RVUs per admission, 1991.

Table 4. Volume per Admission by Type of Service, Florida

Type of Service	Casemix-Adjusted RVUs per Admission, 1991, Florida as a Percentage of the U.S. Mean
Total Evaluation and Management*	115%
Hospital Visits	116%
Consultations	114%
Specialist Evaluation and Management	147%
Total Procedures*	103%
Major Procedures	102%
Eye Procedures	104%
Other Ambulatory Procedures	98%
Endoscopy	116%
Total Imaging	130%
Standard Imaging	141%
Advanced Imaging	161%
Sonography	121%
Imaging Procedures	118%
Other Services*	128%

* Anesthesiology and several subcategories of procedures and evaluation and management are included in 'other services.'

Table 5A.
Physician Procedural Services
in the 25 Florida Hospitals with the Most Admissions
(Casemix-Adjusted RVUs per Admission,
as a Percent of the Florida Mean)

OBS	Hospital	Volume per Admission	Total	Total Procedures	Major Procedures	Ambulatory Procedures	Endoscopy
1	BOCA RATON COMMUNITY HOSPITAL	47.2	103.1	109.8	111.4	93.9	108.6
2	FLORIDA HOSPITAL MEDICAL CTR	46.2	100.8	104.4	103.4	170.1	102.5
3	HCA BAYONET POINT-HUDSON CTR	45.5	99.4	101.3	101.4	130.5	119.5
4	HCA L W BLAKE HOSPITAL	41.5	90.6	96.6	96.0	130.8	89.0
5	HCA LARGO MED CENTER HOSPITAL	42.3	92.3	98.6	97.6	86.5	122.6
6	HCA MARION COMMUNITY HOSPITAL	43.2	94.3	102.3	103.1	85.8	121.4
7	HCA NEW PORT RICHEY HOSPITAL	51.4	112.2	122.0	126.1	105.1	101.5
8	HCA NORTH FLORIDA REG MED CTR	37.8	82.5	106.4	111.3	79.4	86.0
9	HOLMES REGIONAL MEDICAL CENTER	44.5	97.3	97.0	97.1	104.8	103.6
10	LAKELAND REGIONAL MED CENTER	38.0	83.0	101.3	103.6	94.3	96.0
11	LEE MEMORIAL HOSPITAL	46.1	100.7	132.0	134.2	118.4	131.5
12	MANATEE MEMORIAL HOSPITAL	49.3	107.6	91.7	91.7	99.6	92.5
13	MARTIN MEMORIAL HOSPITAL	45.7	99.7	97.9	95.8	96.0	115.1
14	MERCY HOSPITAL	51.9	113.2	92.0	90.6	96.7	106.4
15	MORTON F PLANT HOSPITAL	48.6	106.1	109.7	109.7	119.8	112.2
16	MOUNT SINAI MEDICAL CENTER	55.5	121.2	113.1	115.6	93.7	118.7
17	NAPLES COMMUNITY HOSPITAL	41.2	89.9	101.1	99.7	115.0	104.7
18	ORLANDO REGIONAL MED CENTER	45.9	100.2	98.7	100.6	99.8	91.1
19	SARASOTA MEMORIAL HOSPITAL	42.6	92.9	102.3	103.1	109.2	100.4
20	SOUTHWEST FLORIDA REG MED CNTR	46.5	101.5	130.4	134.4	114.9	120.5
21	ST JOSEPH'S HOSPITAL	49.8	108.8	95.9	98.3	82.8	90.4
22	ST VINCENT'S MEDICAL CENTER	44.3	96.7	97.3	99.9	81.5	86.2
23	TALLAHASSEE MEM REG MED CENTER	40.7	88.8	91.1	92.2	97.7	80.0
24	VENICE HOSPITAL	38.5	84.1	103.1	100.9	93.8	129.5
25	WINTER HAVEN HOSPITAL	37.7	82.3	91.8	94.4	86.7	77.5

Table 5B
Physician Imaging Services
in the 25 Florida Hospitals with the Most Admissions
(Casemix-Adjusted RVUs per Admission,
as a Percent of the Florida Mean)

OBS	Hospital	Volume per Admission	Total Imaging	Standard Imaging	Advanced Imaging	Sonography	Imaging Procedures	CT	MRI	Cardiac Cath Lab
1	BOCA RATON COMMUNITY HOSPITAL	47.2	85.9	71.0	57.0	92.5	121.7	Yes	No	Yes
2	FLORIDA HOSPITAL MEDICAL CTR	46.2	89.5	61.1	43.6	65.6	124.1	Yes	Yes	Yes
3	HCA BAYONET POINT-HUDSON CTR	45.5	111.6	198.7	210.0	77.5	99.4	.	.	.
4	HCA L W BLAKE HOSPITAL	41.5	89.2	82.3	48.2	62.8	129.7	Yes	No	Yes
5	HCA LARGO MED CENTER HOSPITAL	42.3	76.3	59.0	44.1	63.0	110.5	Yes	No	Yes
6	HCA MARION COMMUNITY HOSPITAL	43.2	82.0	64.7	51.2	.	.	No	No	Yes
7	HCA NEW PORT RICHEY HOSPITAL	51.4	170.3	191.2	194.0	99.7	122.1	Yes	No	Yes
8	HCA NORTH FLORIDA REG MED CTR	37.8	77.2	46.1	34.7	69.4	116.1	Yes	Yes	Yes
9	HOLMES REGIONAL MEDICAL CENTER	44.5	95.7	72.3	.	112.8	123.6	Yes	Yes	Yes
10	LAKELAND REGIONAL MED CENTER	38.0	93.1	74.8	111.0	81.2	113.0	Yes	No	Yes
11	LEE MEMORIAL HOSPITAL	46.1	75.3	52.6	45.8	64.7	113.6	No	No	Yes
12	MANATEE MEMORIAL HOSPITAL	49.3	167.0	199.2	191.7	246.3	111.1	Yes	No	Yes
13	MARTIN MEMORIAL HOSPITAL	45.7	79.8	66.5	63.6	99.0	.	Yes	No	Yes
14	MERCY HOSPITAL	51.9	78.6	.	.	.	97.4	No	No	Yes
15	MORTON F PLANT HOSPITAL	48.6	151.7	204.1	216.3	121.3	133.4	Yes	Yes	Yes
16	MOUNT SINAI MEDICAL CENTER	55.5	87.2	77.6	48.4	.	116.8	Yes	Yes	Yes
17	NAPLES COMMUNITY HOSPITAL	41.2	63.7	53.0	63.8	77.9	.	Yes	Yes	Yes
18	ORLANDO REGIONAL MED CENTER	45.9	88.1	84.7	57.1	.	106.5	Yes	No	Yes
19	SARASOTA MEMORIAL HOSPITAL	42.6	84.5	50.5	39.1	63.7	124.5	Yes	Yes	Yes
20	SOUTHWEST FLORIDA REG MED CNTR	46.5	74.7	49.5	47.7	57.7	105.1	Yes	Yes	Yes
21	ST JOSEPH'S HOSPITAL	49.8	150.6	203.8	226.8	149.9	117.5	Yes	Yes	Yes
22	ST VINCENT'S MEDICAL CENTER	44.3	78.1	71.6	54.0	81.9	99.5	Yes	Yes	Yes
23	TALLAHASSEE MEM REG MED CENTER	40.7	127.4	119.1	194.9	126.1	111.5	Yes	No	Yes
24	VENICE HOSPITAL	38.5	66.2	58.1	41.7	97.7	79.2	Yes	Yes	Yes
25	WINTER HAVEN HOSPITAL	37.7	71.0	57.9	53.2	.	.	Yes	Yes	Yes

Table 5C.
Other Physician Services
in the 25 Florida Hospitals with the Most Admissions
(Casemix-Adjusted RVUs per Admission,
as a Percent of the Florida Mean)

OBS	Hospital	Volume per Admission	Total Evaluation and Management	Hospital Visits	Consultations	Other
1	BOCA RATON COMMUNITY HOSPITAL	47.2	110.6	109.0	121.6	85.8
2	FLORIDA HOSPITAL MEDICAL CTR	46.2	108.0	109.5	102.7	90.8
3	HCA BAYONET POINT-HUDSON CTR	45.5	89.6	89.0	90.4	94.8
4	HCA L W BLAKE HOSPITAL	41.5	89.5	92.8	80.5	86.1
5	HCA LARGO MED CENTER HOSPITAL	42.3	86.2	88.0	85.6	105.3
6	HCA MARION COMMUNITY HOSPITAL	43.2	88.3	82.5	96.1	103.7
7	HCA NEW PORT RICHEY HOSPITAL	51.4	97.3	97.0	106.1	99.3
8	HCA NORTH FLORIDA REG MED CTR	37.8	61.7	63.4	55.5	85.5
9	HOLMES REGIONAL MEDICAL CENTER	44.5	100.7	101.8	99.1	93.3
10	LAKELAND REGIONAL MED CENTER	38.0	61.1	61.3	56.8	81.3
11	LEE MEMORIAL HOSPITAL	46.1	76.0	74.0	79.3	105.1
12	MANATEE MEMORIAL HOSPITAL	49.3	103.9	97.1	89.6	97.3
13	MARTIN MEMORIAL HOSPITAL	45.7	103.1	103.6	103.3	122.7
14	MERCY HOSPITAL	51.9	150.3	144.7	146.1	99.0
15	MORTON F PLANT HOSPITAL	48.6	87.3	85.6	93.7	95.3
16	MOUNT SINAI MEDICAL CENTER	55.5	146.7	148.8	125.2	115.5
17	NAPLES COMMUNITY HOSPITAL	41.2	90.0	85.9	94.7	95.8
18	ORLANDO REGIONAL MED CENTER	45.9	101.1	102.5	99.1	122.5
19	SARASOTA MEMORIAL HOSPITAL	42.6	84.2	84.2	77.7	96.5
20	SOUTHWEST FLORIDA REG MED CNTR	46.5	73.5	71.1	82.0	111.9
21	ST JOSEPH'S HOSPITAL	49.8	105.0	102.0	114.9	98.5
22	ST VINCENT'S MEDICAL CENTER	44.3	105.7	108.2	102.2	92.6
23	TALLAHASSEE MEM REG MED CENTER	40.7	75.8	78.9	65.4	85.2
24	VENICE HOSPITAL	38.5	72.9	71.9	71.7	91.1
25	WINTER HAVEN HOSPITAL	37.7	76.7	75.5	85.4	90.0

Figure 1: Linking Physician Services to an Admission

Mr. Smith, a 90 year old, was admitted to Generic Memorial Hospital in DRG 127, Heart Failure and Shock. Mr. Smith was in the hospital for 19 days.

Day	Description of Service	Physician	Quantity	RVUs
1	X-Ray Exam of Abdomen	A	1	0.28
1	Chest X-Ray	A	1	0.28
1	Initial Hospital Care	B	1	3.43
2	Hospital Visit, Intermediate	B	1	1.23
5	Chest X-Ray	A	1	0.28
7	Hospital Visit, Intermediate	B	4	4.92
10	X-Ray Exam of Abdomen	A	1	0.28
12	Hospital Visit, Intermediate	B	4	4.92
Total RVUs				15.62

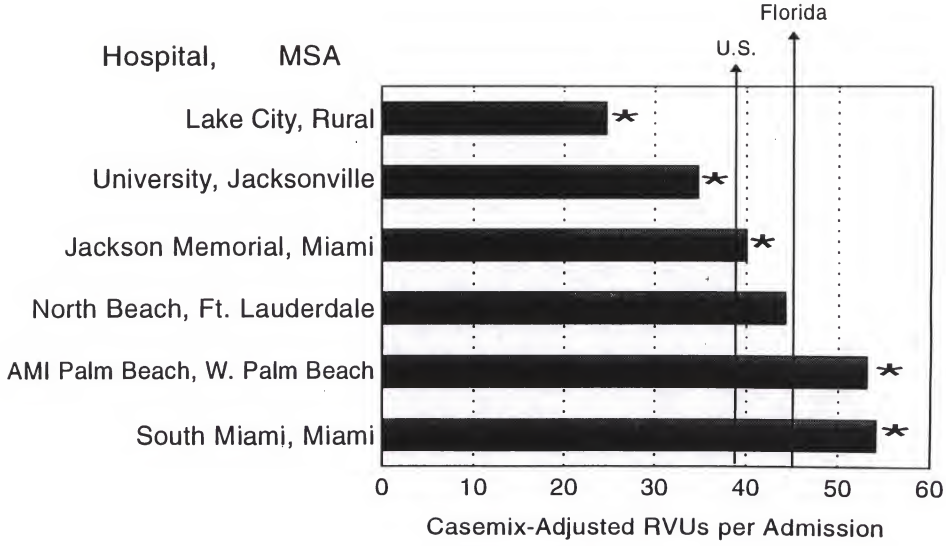
To maintain confidentiality, we modified the beneficiary name, hospital name, and physician IDs.

Figure 2.
Creating RVU-Based Relative Weights for Physician Services

DRG	Description	RVUs	Relative Weight
127	Heart Failure And Shock	21.51	0.57
148	Major Bowel Procedure	92.38	2.45
All DRGs		37.68	1.00

Based on a national sample of beneficiaries (1989).

Figure 3: Volume by Selected Hospital



* Significantly different from the Florida mean.

Figure 4: Volume by Type of Service

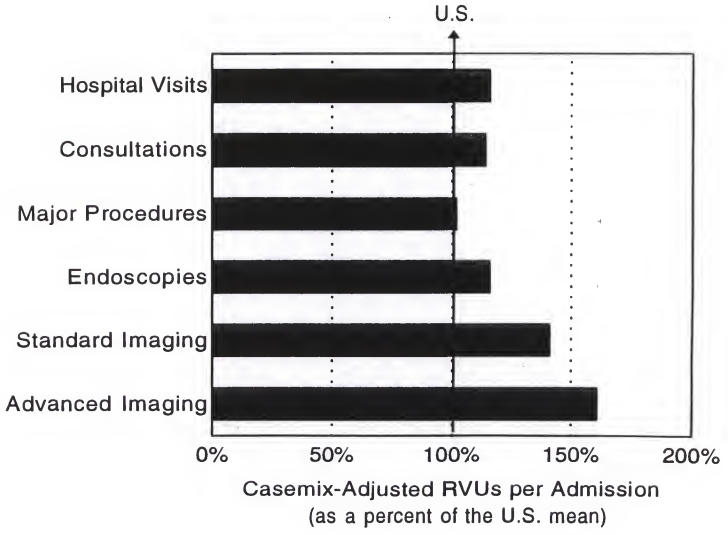


Figure 5.
Urban Hospitals with the Least and Most Volume by Type of Service

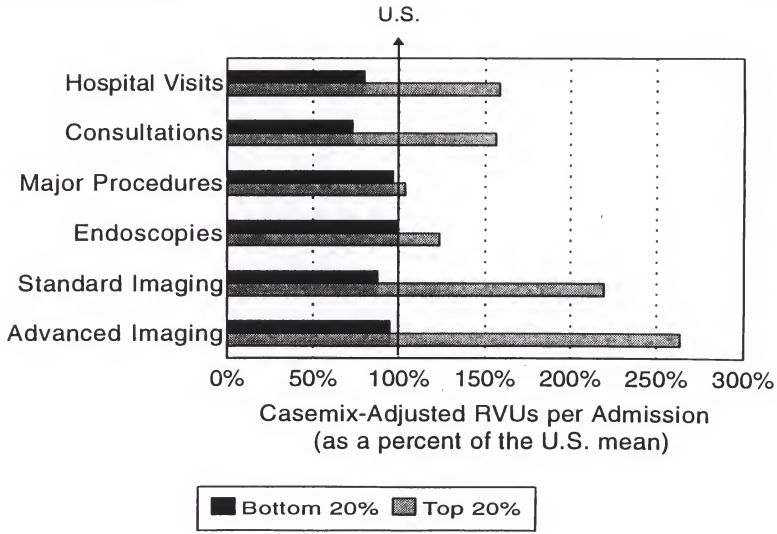


Figure 6: Three Hospitals by Type of Service

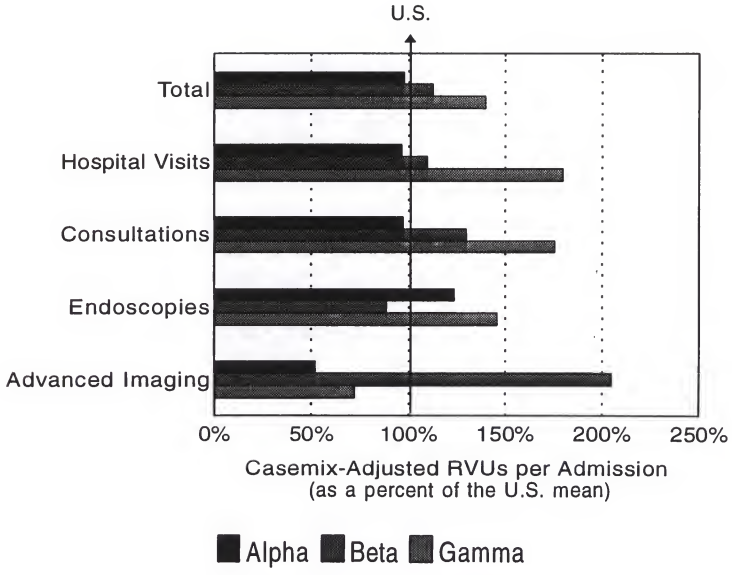
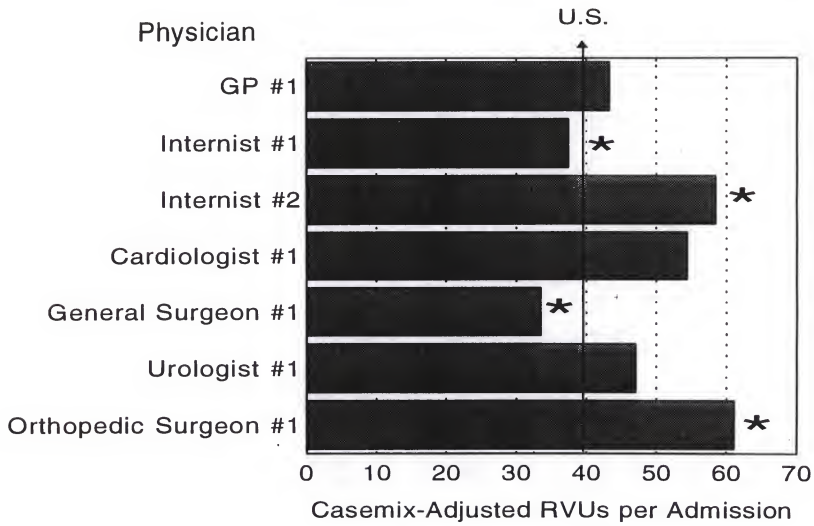


Figure 7: Selected Physicians in Omega Hospital



* Significantly different from hospital mean.